

CLAIMS

At least the following is claimed:

- 1 1. A method of producing a three-dimensional object, comprising the steps of:
2 providing a norbornene based curable material including at least one initiator
3 and at least one norbornene based build material;
4 dispensing the norbornene based curable material onto a build platform; and
5 curing the norbornene based curable material to produce the three-dimensional
6 object.

- 1 2. The method of producing a three-dimensional object of claim 1, wherein the
2 norbornene based curable material is a single-part norbornene based curable material.

- 1 3. The method of producing a three-dimensional object of claim 1, wherein the
2 norbornene based curable material is a multi-part norbornene based curable material.

- 1 4. The method of producing a three-dimensional object of claim 3, further
2 comprising:
3 dispensing the at least one initiator and the at least one norbornene based build
4 material onto the build platform independently, wherein the at least one initiator and
5 the at least one norbornene based build material are commingled to form a multi-part
6 norbornene based curable material.

- 1 5. The method of producing a three-dimensional object of claim 4, wherein
2 dispensing includes:
3 dispensing a layer of the at least one norbornene build material; and
4 dispensing a layer of the initiator onto the layer of the at least one norbornene
5 build material thereby forming the multi-part norbornene based curable material.

- 1 6. The method of producing a three-dimensional object of claim 4, wherein
2 dispensing includes:
3 dispensing a layer of the initiator; and
4 dispensing a layer of the norbornene based build material onto the layer of
5 initiator thereby forming the multi-part norbornene based curable material.

- 1 7. The method of producing a three-dimensional object of claim 4, wherein
2 dispensing the initiator and the norbornene based build material is performed
3 sequentially.

- 1 8. The method of producing a three-dimensional object of claim 4, wherein
2 dispensing the radiation initiator and the build material is performed simultaneously.

- 1 9. The method of producing a three-dimensional object of claim 4, wherein
2 dispensing the initiator and the norbornene based build material further comprises:
3 dispensing the initiator from a first ink-jet printhead and dispensing the
4 norbornene based build material from a second ink-jet printhead.

- 1 10. The method of producing a three-dimensional object of claim 1, wherein the
2 initiator is selected from ring opening metathesis polymerization initiators, radical
3 initiators, photo initiators, and combinations thereof.

- 1 11. The method of producing a three-dimensional object of claim 1, wherein the
2 norbornene based build material is selected from functionalized norbornene
3 compounds, functionalized hetero-norbornene compounds, dicyclopentadiene, and
4 combinations thereof.

1 12. A solid freeform fabrication system for producing a three-dimensional object,
 2 comprising:
 3 a dispensing system including a norbornene based curable material, wherein
 4 the dispensing system is adapted to dispense the norbornene based curable material;
 5 and
 6 a curing system operative to cure the norbornene based curable material.

1 13. The solid freeform fabrication system of claim 12, wherein the norbornene
 2 based curable material includes at least one initiator and at least one norbornene based
 3 build material.

1 14. The solid freeform fabrication system of claim 12, wherein the dispensing
 2 system includes at least one ink-jet printhead.

1 15. The solid freeform fabrication system of claim 14, wherein a first ink-jet
 2 printhead includes the initiator in a first compartment and the norbornene based build
 3 material in a second compartment.

1 16. The solid freeform fabrication system of claim 14, wherein a first ink-jet
 2 printhead includes the initiator and a second ink-jet printhead includes the norbornene
 3 based build material.

1 17. The solid freeform fabrication system of claim 16, wherein the initiator is
 2 selected from ring opening metathesis polymerization initiators, radical initiators,
 3 photo initiators, and combinations thereof.

1 18. The solid freeform fabrication system of claim 16, wherein the initiator
 2 includes a ring opening metathesis polymerization initiator.

1 19. The solid freeform fabrication system of claim 12, wherein the norbornene
2 based build material is selected from functionalized norbornene compounds,
3 functionalized hetero-norbornene compounds, dicyclopentadiene, and combinations
4 thereof.

1 20. The solid freeform fabrication system of claim 12, wherein the norbornene
2 based build material includes a dicyclopentadiene.

1 21. The solid freeform fabrication system of claim 12, further comprising a
2 computer control system operative to control the dispensing system and the curing
3 system.

1 22. The solid freeform fabrication system of claim 12, wherein the curing system
2 is selected from an ultraviolet curing system, a visible curing system, and a thermal
3 curing system.

- 1 23. A method of forming a solid freeform fabrication system, comprising:
2 providing a dispensing system including at least one ink-jet printhead and a
3 curing system; and
4 disposing a norbornene based curable material into one of the at least one ink-
5 jet printheads.
- 1 24. The method of forming a solid freeform fabrication system of claim 23,
2 wherein the norbornene based curable material includes at least one initiator and at
3 least one norbornene based build material.
- 1 25. The method of forming a solid freeform fabrication system of claim 24, further
2 comprising:
3 dispensing the initiator in a first compartment of the ink-jet printhead; and
4 dispensing the norbornene based build material in a second compartment of
5 the ink-jet printhead.
- 1 26. The method of forming a solid freeform fabrication system of claim 24, further
2 comprising:
3 dispensing the initiator in a first ink-jet printhead; and
4 dispensing the norbornene based build material in a second ink-jet printhead.
- 1 27. The method of forming a solid freeform fabrication system of claim 24, further
2 comprising:
3 mixing the at least one norbornene based build material and the at least one
4 initiator; and
5 dispensing the mixture of the at least one norbornene based build material and
6 the at least one initiator into the ink-jet printhead.
- 1 28. The method of forming a solid freeform fabrication system of claim 24,
2 wherein the initiator is selected from ring opening metathesis polymerization
3 initiators, radical initiators, photo initiators, and combinations thereof.

1 29. The method of forming a solid freeform fabrication system of claim 24,
2 wherein the norbornene based build material is selected from functionalized
3 norbornene compounds, functionalized hetero-norbornene compounds,
4 dicyclopentadiene, and combinations thereof.

1 30. The method of forming a solid freeform fabrication system of claim 24,
2 wherein the norbornene based build material includes a dicyclopentadiene.